Areal Coverage and Spatial Distribution of Broadleaf Marsh

Expectation:	Broadleaf marsh (BLM), dominated by pickerelweed (*Pontederia cordata*) and arrowhead (*Sagittaria lancifolia*), will cover 50- 62% of the floodplain in Pools B, C, and D. Spatial distributions of BLM will approximate the distribution in the pre-channelized system and will occur largely in the central portion of the floodplain adjacent to abandoned and active river channels (Pierce et al, 1982).
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Date:	June 6, 1998, revised August 13, 2001
Relevant Endpoints:	Ecological Integrity/Sociopolitical - Total Wetland Area Restoration – System Functional Integrity – Habitat Diversity
Baseline Condition:	Much of the BLM that once dominated the historic floodplain has been drained and converted to pasture, or covered with spoil material from dredging of C-38 (Pierce et al 1982; Milleson et al 1980). The distribution of BLM communities is now limited to depressions and the lower impounded portions of the channelized pools, and extant communities are often invaded by mesophytic species of weeds, grasses, and shrubs. Post-channelization vegetation survey data indicate that BLM accounted for approximately 10% of the floodplain plant communities in Pools B, C, and D in 1978 (Milleson et al 1980). However, in recent years wax myrtle and other facultative upland species have invaded the BLM community in southwest Pool C, while monitoring studies of the Pool B Demonstration Project showed increased coverage by *Pontederia cordata* and *Sagittaria lancifolia* (Toth 1991) in some locations. Baseline data from 1996 aerial photography indicate that BLM communities cover 7.18% (363.7 hectares) of the floodplain in Pool C, which is slightly less than BLM coverage in 1978 (Milleson et al 1980) when BLM communities covered 10.2 % (479.3 hectares) of the floodplain in Pool C.
Reference Condition:	Historical maps indicate that broadleaf marsh covered approximately 50% of the floodplain in Pools B, C, and D (Pierce et al 1982). Expected coverage of BLM communities is greater due to disturbance, particularly in Pool C. The MacArthur impoundment (Figure 1) of Pool C was constructed prior to historical photography used by Pierce et al (1982) to map historical vegetation communities. This system of ditches and levees was created to drain wetlands for pasture use and likely shortened hydroperiods and created unfavorable conditions for BLM species. Because the surrounding area was historically dominated by BLM, it is predicted that these species associations will reestablish within the degraded impoundment after the ditches and levees have been removed and hydrology is restored. BLM species also will colonize some areas of improved and unimproved pasture where wetland shrub species were removed to create pasture.
Mechanism for Achieving Expectation:	Reestablished discharge regimes with consistent over bank flow will be the primary catalyst for vegetation recovery. Once floodplain hydroperiods have returned to near historic depths and temporal frequency, conditions will be conducive for seed bank germination and spread of broadleaf marsh plants, while species less tolerant of inundation will decline. BLM

species will expand by vegetative and sexual reproduction. However, pasture grasses are adapted to periodic wet conditions, so consistently long hydroperiods are needed to displace established bahia grass (*Paspalum notatum*) and bermuda grass (*Cynodon dactylon*). Areas that are currently occupied by spoil and C-38 are predicted to go through successional phases and eventually be colonized by BLM species.

Adjustments for External Constraints: None

Means of Evaluation: Aerial overflights will be conducted every three years following initiation of canal backfilling, with the first set of post-construction photography acquired in spring 2003. Aerial photography will be photointerpreted and georeferenced to produce a seamless vegetation map. Signatures that indicate a dominance of *Sagittaria lancifolia* and *Pontederia cordata* and co-dominance with *Panicum hemitomon* will identify BLM polygons. Other BLM species associations include cutgrass (*Leersia hexandra*), buttonbush (*Cephalanthus occidentalis*), and swamp rosemallow (*Hibiscus grandiflorus)* (Table 1).

The associated geographical information system (GIS) will be queried for acreage amounts of polygons fitting decision rules for BLM community types. Polygon coverage of the recovering BLM will be compared to the baseline and historic BLM coverage to determine incremental changes in areal coverage and spatial distribution of BLM communities. BLM coverages will be scaled as a percentage of total floodplain vegetation . The spatial distribution of restored BLM is expected to overlap the historic distribution by approximately 90%.

Time Course: Broadleaf marsh vegetation will quickly respond. By the first growing season after backfilling, there should be an increase in BLM species associations on the floodplain and within two years, a significant expansion of BLM should occur. However, the rate of transition of vegetation communities will be linked closely to hydrological conditions in the years immediately following backfilling (Toth et al 1995). If the floodplain experiences extended drought conditions in early years of recovery, it is possible that competitive upland herbaceous and shrub species will colonize and/or persist in areas that are expected to rapidly revert to BLM.

The BLM community is expected to increase incrementally and make up approximately 62% of the floodplain in Pool C by the second growing season after completion of Phase I backfilling. Within two years after completion of Pool D backfilling, the BLM community should cover 64% of the affected floodplain. In Pool B it is expected that 38% of the floodplain will be made up of BLM species within two years after Phase IV backfilling. BLM community types should reach the target of over 50% of floodplain coverage in Pools B-D within two growing seasons after project completion, i.e. approximately spring of 2012.

Table 1. Common BLM species on the Kissimmee River floodplain.

Scientific Name	Common Name
Alternanthera philoxeroides	alligator weed
Bacopa caroliniana	Carolina water hyssop
Centella asiatica	Asian coinleaf
Cephalanthus occidentalis	buttonbush
Cyperus spp.	Flatsedges
Luziola fluitans	common watergrass
Hibiscus grandiflorus	swamp rosemallow
Hydrocotyle umbellata	penny wort
Leersia hexandra	cut grass
Nuphar lutea	spatterdock
Panicum hemitomon	maidencane
Polygonum punctatum	dotted smartweed
Pontederia cordata	pickerelweed
Sagittaria lancifolia	bull-tongue arrowhead

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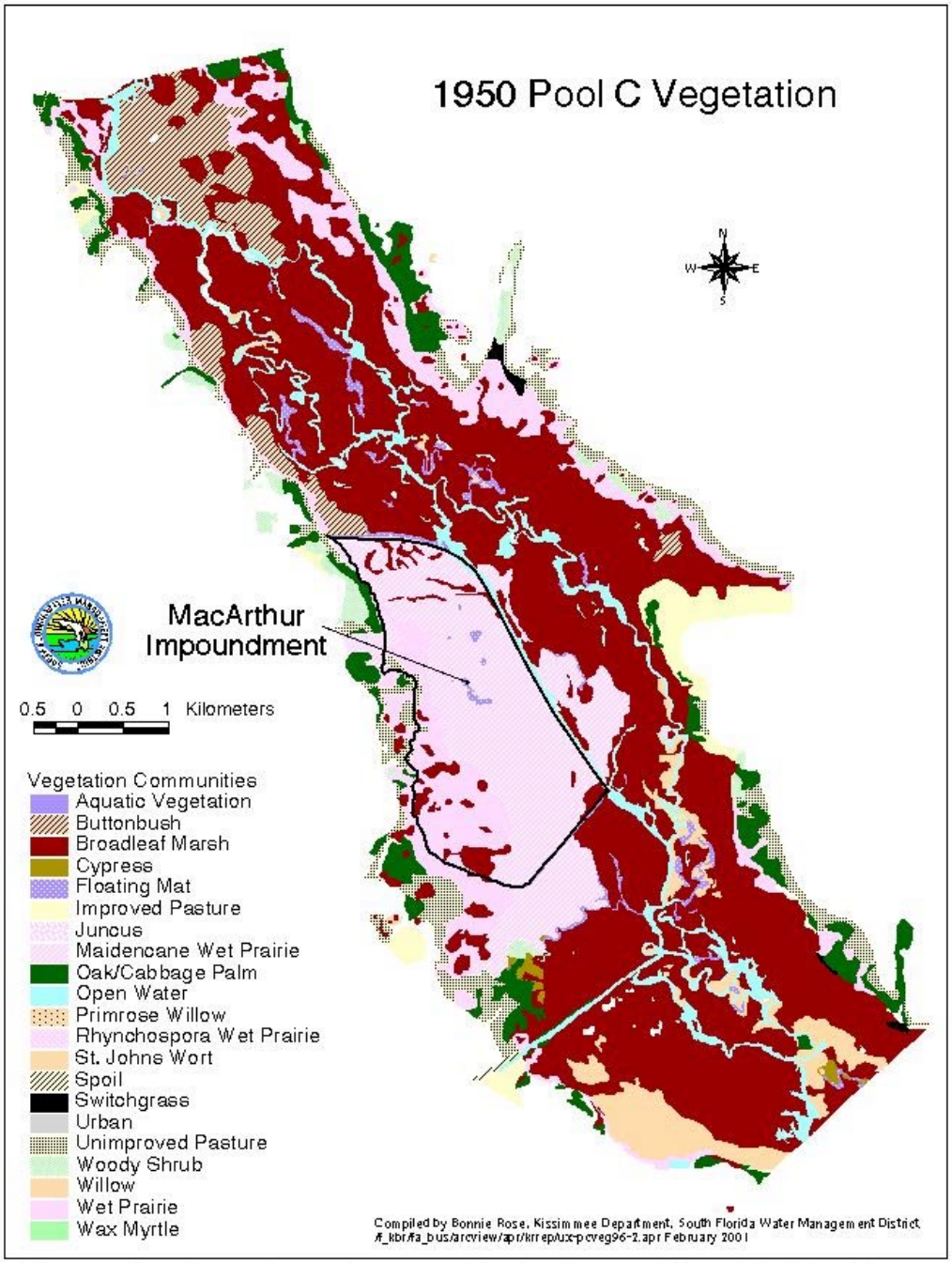

Figure 1. Map of grouped vegetation communities photointerpreted from 1950 CIR aerial photography (Pierce et al, 1982). Area delineated in the central portion of the pool, west of C-38 is the MacArthur Impoundment.